

REMARKS

Claims 1-22 and 24-26 are presently pending in the application, with claims 23 and 27 withdrawn in response to a restriction requirement. No claims have been amended, cancelled, or added by this response.

In the Office Action mailed May 4, 2005, claims 1-22 and 24-26 were rejected. More specifically, the status of the application in light of this Office Action is as follows:

(A) Claim 24 stands rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,618,822 to Hansen ("Hansen");

(B) Claims 1-3 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,836,842 to Zimmermann et al. ("Zimmermann");

(C) Claims 4-9 and 15-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zimmermann in view of U.S. Patent No. 5,211,129 to Taylor et al. ("Taylor") or U.S. Patent No. 6,400,338 to Mejia et al. ("Mejia");

(D) Claims 10 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zimmermann in view of Taylor or Mejia as applied to claims 1 and 4-8, and in further view of U.S. Patent No. 6,441,741 to Yoakum ("Yoakum");

(E) Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zimmermann in view of Yoakum;

(F) Claims 20 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mejia;

(G) Claim 21 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mejia in view of Yoakum;

(H) Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoakum in view of Taylor or Mejia;

(I) Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mejia in view of Hansen; and

(J) Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,087,791 to Lemberger ("Lemberger") in view of Taylor.

A. Response to Section 102 Rejection of Claim 24 (Hansen)

Independent claim 24 stands rejected under 35 U.S.C. § 102(b) as being anticipated by Hansen. For the reasons explained below, this rejection is not proper because the cited reference does not disclose or suggest all of the claimed features.

1. Claim 24 is Directed to a Resonating Marker Assembly Including, Inter Alia, a Ferromagnetic Core and an Axially Adjustable Segment that Projects Outwardly with Respect to a Longitudinal Axis of the Core

Independent claim 24 is directed to a resonating marker assembly including a ferromagnetic core having a first end and a second end. A wire coil is disposed around the core between the first and second ends, and a capacitor is connected to the wire coil. The core, coil, and capacitor form a signal element that, when energized, generates a magnetic field at a selected resonating frequency. The marker assembly further includes an axially adjustable segment at the second end of the core that projects outwardly with respect to the longitudinal axis of the core.

2. Hansen is Directed to a Displacement Sensing Device Including Adjustable Tuned Circuitry

Hansen discloses a displacement sensing device including adjustable tuned circuitry to calculate the displacement between two objects with respect to each other. Referring to Figure 1, Hansen discloses a sensor 10 including a ferrite rod 11, a coil 13, and a capacitor 15 connected to the coil 13. The coil 13 is positioned about the rod 11 so that the rod 11 can reciprocate within the coil 13. The sensor 10 further includes (a) a first set of hooks 17 at a free end 12 of the rod 11 to connect the sensor 10 to a first object (e.g., a bone 2), and (b) a second set of hooks 19 at the opposite end of the rod 11 to connect the sensor 10 to a second object (e.g., a bone 4). As the bones 2 and

4 move relative to each other, the rod 11 can reciprocate within the coil 13, resulting in a relative change in the resonant frequency of the sensor 10.

3. Claim 24 is Allowable Over Hansen Because this Reference Fails to Teach or Suggest an Axially Adjustable Segment at the Second End of the Core that Projects Outwardly With Respect to the Longitudinal Axis of the Core

Claim 24 is patentable over Hansen under Section 102 because this reference fails to teach or suggest an "axially adjustable segment at the second end of the core that projects outwardly with respect to the longitudinal axis of the core." In contrast, Hansen discloses a single, unitary rod 11 that moves or reciprocates relative to the coil 13. Nowhere does Hansen teach or suggest that the free end 12 of the rod 11 includes an "axially adjustable segment." Instead, Hansen teaches that the rod 11 is fixed to the bones 2 and 4 with the first and second set of hooks 17 and 19, respectively, so that as the bones 2 and 4 move relative to each other, the rod 11 moves relative to the coil 13. Accordingly, Hansen does not disclose at least one element of claim 24 and the Section 102 rejection should be withdrawn.

B. Response to Section 103 Rejection of Claims 1-3 and 12 (Zimmermann)

Claims 1-3 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zimmermann. The Office Action asserts that (a) Figure 1b of Zimmermann discloses a marking device having coincident geometric and magnetic centers, and (b) a miniature version of the marking device of Zimmermann "with smaller size electrical elements that provides a shorter communication range is do-able." (Office Action, p. 3-4.) For the reasons explained below, however, applicants respectfully disagree with the Examiner.

1. Independent Claim 1 is Directed to a Miniature Resonating Marker Assembly Including, *Inter Alia*, a Signal Element Having a Core, a Wire Coil Around the Core, a Capacitor Connected to the Wire Coil, and an Inert Encapsulation Member Encapsulating the Signal Element

Independent claim 1 is directed to a miniature resonating marker assembly. The miniature resonating marker assembly includes a core, a wire coil disposed around the

core, and a capacitor connected to the wire coil adjacent to the magnetic core. The core, coil, and capacitor form a signal element that generates a magnetic field at a selected resonating frequency in response to a wirelessly transmitted source field. The magnetic field has a magnetic center point positioned along a first axis of the core. An inert encapsulation member encapsulates the signal element and defines a geometric shape of the resonating marker assembly. The geometric shape has a geometric center point substantially coincident with the magnetic center point along at least a first axis of the signal element. Accordingly, when a user locates the marker assembly's magnetic center point, the user will have also located the marker assembly's geometric center point. Conversely, when a user locates the marker assembly's geometric center, the user will have also located the marker assembly's magnetic center point.

2. Zimmermann is Directed to a Passive Marking Device for Placement in a Location Such that the Location is Thereafter Identifiable with a Suitable Interrogating Instrument

Zimmermann discloses a passive marking device 1 for marking a location underground and a suitable interrogating instrument 100 used to find the buried marking device. Referring to Figures 1a-1c, the marking device 1 includes a coil 4 of insulated conductor wire placed on an elongated ferrite core 5. A capacitor 6 is connected in parallel with the coil 4. The core 5 is 1 cm in diameter and 20 cm in length. The marking device 1 is tuned by adjusting the longitudinal position of the coil 4 on the core 5 such that the marking device has a resonant frequency of 62.5 KHz. (Zimmermann, col. 6, Ins. 3-11.) The marking device 1 also includes a rigid encapsulation 3 formed from a thermosetting epoxy material that will break or shatter along with the core 5 if the marking device 1 is subjected to a mechanical shock. (Zimmermann, col. 6, Ins. 24-29.) As seen in Figure 6, the interrogating instrument 100 includes (a) a generating portion that generates a continuous wave magnetic field, and (b) a detecting portion that detects a fluctuating magnetic field. The presence of the marking device 1 is indicated when the interrogating instrument 100 detects the magnetic field resulting from the resonance of the marking device during interruptions in the field from the generating portion. The interrogating instrument 100 can find the position of the buried marking

device 1 to within an area of approximately two inches or less. (Zimmermann, col. 13, Ins. 43-44.)

3. Claim 1 is Allowable over Zimmermann Because this Reference Does Not Teach or Suggest all of the Claimed Features and is Fundamentally Flawed for Use with Very Small Transmitters in Human Patients

Claim 1 is patentable over Zimmermann under Section 103 because (a) the cited reference does not disclose or suggest all of the claimed features, and (b) a person skilled in the art would not be motivated to modify Zimmermann's marking devices for markers used in human patients. Claim 1, for example, recites that the marker assembly includes a magnetic center point positioned along the first axis of the core and a geometric center point substantially coincident with the magnetic center point. Nowhere does Zimmermann teach or suggest this feature. The Office Action asserts that Figure 1b of Zimmermann appears to show coincidence between the geometric center and the magnetic center of the marking device. (Office Action, p. 3.) This is not correct. Referring to Figure 1b of Zimmermann, the marking device 1 has a geometric center at approximately a center portion of the device. On the other hand, the capacitor 6 in the marking device 1 is spaced apart from the core 5 and the coil 4 in a manner that shifts the magnetic center of Zimmermann's device axially along the length of the core away from the geometric center of the device. Furthermore, the position of the relevant electrical components in Zimmermann (i.e., the coil 4, core 5, and capacitor 6) are fixed with respect to one another within the encapsulant 3 after tuning the device to 62.5 KHz such that the magnetic center cannot be moved or adjusted to be coincident with the geometric center. Accordingly, the magnetic center of Zimmermann's device is not coincident with the geometric center.

The Office Action goes on to concede that the marking device of Zimmermann may not have coincident geometric and magnetic centers, but that depending on the desired resonating frequency, "the position of the coil [4] or number of windings over the core [5] can be different which leads to the possibility of coinciding the magnetic center and geometric center" as required by claim 1. (Office Action, p. 12.) As discussed

above, however, Zimmermann explicitly teaches that the longitudinal position of the coil 4 is adjusted relative to the core 5 to tune the marking device to a frequency of 62.5 KHz, after which the marking device 1 is encapsulated with an encapsulating material, thereby making any further adjustments generally impossible. Therefore, it would not have been obvious (or even possible) to modify the arrangement of the coil 4 or number of windings over the core 5 in Zimmermann's marking device 1 to come up with the claimed combination of elements.

The MPEP states that "[o]bviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the reference[s] themselves or in the knowledge generally available to one of ordinary skill in the art." (MPEP § 2143.01; emphasis added.) The MPEP further states that the mere fact that a reference can be modified does not render the resultant combination obvious "unless the prior art also suggest the desirability of the combination." (*Id.*; emphasis added.) Here, the prior art does not suggest the desirability of modifying the device of Zimmermann to have coincidence between the geometric center and the magnetic center of the marking device. Zimmermann's device, in use, does not require such precision and Zimmermann appears to teach away from such a modification. There is no need or motivation to align the magnetic and geometric centers of Zimmermann's device and, accordingly, the Section 103 rejection of claim 1 over Zimmermann should be withdrawn.

Claim 1 is further patentable over Zimmermann under Section 103 because a person skilled in the art would not be motivated to modify or otherwise use Zimmermann's passive marking device for use in human patients. As mentioned previously, the Office Action asserts that miniaturizing Zimmermann's marking device with smaller components is "do-able" and, accordingly, it would have been obvious to one skilled in the art to modify Zimmermann's marking device in such a way. For at least the reasons explained below, however, the Office Action's assertions are not correct.

Zimmermann is fundamentally flawed for use with very small transmitters in human patients. More specifically, although Zimmermann teaches a system for locating an object using a magnetic field, a person skilled in the art would have recognized the difficulties in miniaturizing Zimmerman's marker for use in a human to perform medical procedures. The field strength of an alternating current magnetic transponder is, in part, a function of the number of windings in the coil and the size and material of the core. The field strength for a marking device having a diameter as claimed would be extremely small and difficult to distinguish.

This gives rise to several problems not faced by miniaturizing the very large marker of Zimmerman. First, to induce enough voltage in the circuit of such a small marking device, the interrogating instrument must generate a magnetic field several orders of magnitude larger than that of the marking device's field. Second, such large source fields drown out the signal from the small markers. Third, even if the marker signal is detected, it is so small that it is subject to noise in the field. Zimmerman does not face these challenges, and Zimmerman also does not have the concerns of implanting a marker in a human. Moreover, Zimmermann teaches that the interrogating instrument generates a continuously magnetic wave which would likely interfere with the signal from a marker configured to be implanted in a patient. As a result, the location of small implantable marking devices computed by Zimmermann's system would be unreliable and subject to errors. A person skilled in the art would thus be deterred from reducing the size of Zimmermann's device to the claimed size of the marking assembly. Claim 1 is accordingly patentable over Zimmermann under Section 103 for this additional reason because it would not have been obvious at the time of the invention to modify the passive marking device of Zimmermann to be contained within a miniature biocompatible body to be implanted into a human patient.

Claims 2, 3, and 12 are allowable as depending from allowable base claim 1, and also because of the additional features of these dependent claims. Accordingly, the Section 103 rejection of claims 2, 3, and 12 should be withdrawn.

C. Response to Section 103 Rejection of Claims 4-9 and 15-18
(Zimmermann, Taylor, Mejia)

Claims 4-9 and 15-18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zimmermann in view of Taylor or Mejia. Claims 4-9 and 15-18 depend from base claim 1. As discussed above, Zimmermann fails to disclose or suggest all the features of claim 1. Taylor and Mejia fail to cure the above-noted deficiencies of Zimmermann to support a Section 103 rejection of claim 1. Accordingly, dependent claims 4-9 and 15-18 are allowable over Zimmermann, Taylor, and Mejia for at least the reason that these references, either alone or in combination, fail to disclose or suggest the features of claim 1 and the additional features of claims 4-9 and 15-18. Therefore, the Section 103 rejection of dependent claims 4-9 and 15-18 should be withdrawn.

D. Response to the Section 103 Rejection of Claims 10 and 11
(Zimmermann, Taylor, Mejia, Yoakum)

Claims 10 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zimmermann in view of Taylor or Mejia, and in further view of Yoakum. Claims 10 and 11 depend from base claim 1. As discussed above, Zimmermann fails to disclose or suggest all the features of claim 1. Taylor, Mejia, and Yoakum fail to cure the above-noted deficiencies of Zimmermann to support a Section 103 rejection of claim 1. Accordingly, dependent claims 10 and 11 are allowable over Zimmermann, Taylor, Mejia, and Yoakum for at least the reason that these references, either alone or in combination, fail to disclose or suggest the features of claim 1 and the additional features of claims 10 and 11. Therefore, the Section 103 rejection of dependent claims 10 and 11 should be withdrawn.

E. Response to the Section 103 Rejection of Claims 13 and 14 (Zimmermann
and Yoakum)

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Zimmermann in view of Yoakum. Claims 13 and 14 depend from base claim 1. As discussed above, Zimmermann fails to disclose or suggest all the features of claim 1. Yoakum fail to cure the above-noted deficiencies of Zimmermann to support a

Section 103 rejection of claim 1. Accordingly, dependent claims 13 and 14 are allowable over Zimmermann and Yoakum for at least the reason that these references, either alone or in combination, fail to disclose or suggest the features of claim 1 and the additional features of claims 13 and 14. Therefore, the Section 103 rejection of dependent claims 13 and 14 should be withdrawn.

F. Response to the Section 103 Rejection of Claims 20 and 26 (Mejia)

Claims 20 and 26 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Mejia. For the reasons explained below, this rejection is not proper because the applied reference fails to disclose or suggest all the claimed features.

1. Claim 20 is Directed to a Miniature Resonating Marker Assembly Having a Geometric Center Coincident with the Assembly's Magnetic Center

Independent claim 20 is directed to a miniature resonating marker assembly including a ferromagnetic core having an elongated central portion and first and second ferromagnetic endcaps at opposite ends of the central portion. The core is substantially symmetrical about a longitudinal axis of the core, but it is asymmetrical about a lateral axis of the core. A wire coil is disposed around the central portion of the core between the first and second endcaps, and a capacitor is connected to the wire coil. The core, coil, and capacitor form a signal element that, when energized, generates a magnetic field at a selected resonating frequency. The magnetic field has a magnetic center point positioned along a first axis coincident with the geometric center of the resonating marker assembly.

2. Mejia Discloses a Passive Integrated Transponder Tag Including a Unitary Antenna Core

Mejia teaches a passive integrated transponder (PIT) tag for implantation in laboratory animals, pets, or livestock. Referring to Figures 8-10 of Mejia, this reference discloses a PIT tag 10 having a unitary core 12 (i.e., a one-piece core) extending substantially the entire length of the tag 10 and an encapsulation means 34 encasing the core 12. The core 12 includes a coil forming portion 16 at one end of the core 12

and an integrated circuit (IC) support portion 18 at the other end of the core 12. The coil forming portion 16 includes a center portion 36 having beveled ends 40 leading to end portions 42. Wire is wound around the center portion 36 of the coil forming portion 16 to form a coil 20. The IC support portion 18 is a flattened plane that extends beneath and supports an integrated circuit 14 and a capacitor 28. The IC support portion 18 can further include metallization layers 26 to electrically couple the coil 20 to the integrated circuit 14 and capacitor 28. The capacitor 28 is an optional component that may be eliminated, as a matter of design choice, depending on the particular integrated circuit 14 used in a given PIT tag.

3. Claim 20 is Allowable Over Mejia Because this Reference Fails to Teach or Suggest a Magnetic Center Point Coincident with a Geometric Center Point

Claim 20 is patentable over Mejia under Section 103 because this reference fails to teach or suggest a magnetic center point coincident with the device's geometric center point. To the contrary, the magnetic center point of Mejia's PIT tag is not even close to its geometric center point. The Office Action correctly asserts that "Mejia does not disclose that the magnetic center along a first axis [is] coincident with the geometric center of [Mejia's tag]." (Office Action, p. 7.) The Office Action, however, incorrectly states that it is possible that the magnetic center and geometric center of Mejia's PIT tag can be coincident by "modifying the shape or configuration of the unitary core of Mejia" (e.g., removing the IC 14 altogether, changing the configuration of the IC support portion 18, the transition portion 44, and/or the end portions 42 of the core 12). (*Id.*)

The MPEP states that "[i]f a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification." (MPEP § 2143.01; emphasis added.) Furthermore, "[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious." (*Id.*; emphasis added) The Office Action admits that the magnetic center is not at the geometric center of Mejia's PIT tag, and then tries to assert that it could be

possible for the magnetic center and geometric center of the PIT tag to be coincident. Mejia does not teach or suggest this claimed feature, and a person skilled in the art would not be motivated to modify the structure of Mejia's PIT tag such that the geometric and magnetic centers of the device were coincident. The Office Action relies on several portions of Mejia that teach the configuration of the transition portion 44 and the integrated circuit support portion 18 of the PIT tag 10 can be different than that shown in the figures. (Mejia, col. 4, lns. 42-64.) Nowhere does Mejia teach or suggest, however, that the PIT tag 10 can be reconfigured such that the magnetic and geometric centers are coincident. In fact, the unitary, one-piece core 12 of Mejia does not allow for any major adjustment of the magnetic center point. Elimination of the transition portion 44 and/or reconfiguration of the integrated circuit support portion 18 would not align the magnetic center point with the geometric center point of Mejia's PIT tag 10. Accordingly, the Section 103 rejection of claim 20 should be withdrawn.

4. Claim 26 is Directed to a Miniature Resonating Marker Assembly Including, *Inter Alia*, a Capacitor Having an Aperture Therethrough

Independent claim 26 is directed to a miniature resonating marker assembly including an elongated ferromagnetic core, a wire coil connected to the capacitor, and a capacitor having an aperture therethrough. The core extends through the aperture in the capacitor and the coil includes a first portion around the core on one side of the capacitor and a second portion around the core on the other side of the capacitor. An inert encapsulation member encapsulates the capacitor, coil, and core.

5. Claim 26 is Allowable Over Mejia Because this Reference Fails to Teach or Suggest a Capacitor Having an Aperture

Claim 26 is also patentable over Mejia under Section 103 because this reference fails to teach or suggest a capacitor having an aperture therethrough. The Office Action asserts that Mejia differs from the claimed invention "in that it does not disclose the specific arrangement/position of the capacitor, core and coil. However such specification is merely a matter of design choice on packaging and therefore an obvious modification to the assembly of Mejia." (Office Action, p. 8.) One of the primary inventive aspects of Mejia, however, is the specific arrangement of the coil forming

portion 16 and the integrated circuit support portion 18. For example, Mejia teaches that the PIT tag "may be able to sustain more shock and vibration than conventional PIT tags because the integrated circuit support portion 18 physically supports the integrated circuit 14 and/or capacitor 28." (Mejia, col. 7, Ins. 42-46.)

In contrast to Mejia, claim 26 teaches that the capacitor has an aperture therethrough and that the core extends through the aperture in the capacitor such that the first portion of the wire coil is on one side of the capacitor and the second portion of the coil is on the other side of the capacitor. As mentioned previously, MPEP § 2143.01 states that if proposed modifications to the prior art invention would make the prior art invention unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. Here, it would be impracticable to modify Mejia's PIT tag in accordance with the claimed arrangement and destroy one of Mejia's primary inventive aspects. Accordingly, the Section 103 rejection of claim 26 over Mejia should be withdrawn.

G. Response to the Section 103 Rejection of Claim 21 (Mejia and Yoakum)

Claim 21 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mejia in view of Yoakum. The Office Action asserts that it would have been obvious to modify the PIT tag of Mejia in light of Yoakum to make "one endcap adjustable/movable for positioning the coil over the core to tune the marker to the specific resonant frequency . . ." (Office Action, p. 8.) Claim 21 is patentable over Mejia and Yoakum under Section 103 because, as discussed above, modifying the unitary core 12 of Mejia in such a way would obviate one of the primary inventive aspects of Mejia. Furthermore, Mejia specifically discloses that the unitary core 12 is a "one-piece core." (Mejia, col. 2, In. 55.) Accordingly, Mejia teaches away from including the movable endcap of claim 21. Moreover, Yoakum fails to cure the above-noted deficiencies of Mejia or provide sufficient motivation to modify Mejia's device. Accordingly, the Section 103 rejection of claim 21 should be withdrawn.

The Office Action cites Hansen to further support the assertion that the core 12 of Mejia could be modified to include the claimed features. The Office Action's

characterization of Hansen, however, is incorrect. For example, the Office Action asserts that Hansen discloses "a movable endcap 12" and that a "change in the displacement of the endcap 12 provides a different resonant frequency from the marker 10." (Office Action, p. 14.) As discussed above, Hansen does not include a movable endcap. The core 11 of Hansen is a unitary rod that moves or reciprocates relative to the coil 13. The free end 12 of the core 11 is fixed to an object (e.g., the bone 2), and the entire core 11 moves relative to the coil 13 as the bone 2 itself moves. Nowhere does Hansen disclose or suggest the endcap of claim 21 that is "movable relative to the coil and capacitor for tuning the marker assembly to a selected resonant frequency." Accordingly, for at least this additional reason the Section 103 rejection of claim 21 should be withdrawn.

H. Response to the Section 103 Rejection of Claim 22 (Yoakum, Taylor, Mejia)

Claim 22 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoakum in view of Taylor or Mejia. The Office Action asserts that "it would have been obvious . . . to modify the core of Yoakum to include endcaps as taught by Taylor and Mejia so that the coil with the sleeve is securely positioned over the core to prevent variation in the marker's resonating frequency." (Office Action, p. 9.) For the reasons explained below, however, applicants respectfully disagree with the Examiner.

1. Claim 22 is Directed to a Miniature Resonating Marker Assembly Including, *Inter Alia*, an Elongated Plastic Sleeve with a Wire Coil Disposed on the Sleeve

Independent claim 22 is directed to a miniature resonating marker assembly having an elongated plastic sleeve with a wire coil disposed on the sleeve. A central portion of a ferromagnetic core extends through the sleeve and a pair of endcaps are connected to the central portion of the core so that the sleeve is positioned between the endcaps. A capacitor is operatively connected to the wire coil and positioned adjacent to the ferromagnetic core to form a signal element tunable to resonate at a selected frequency. The core is axially movable relative to the sleeve and the coil for tuning the marker assembly to have a selected inductance value.

2. Yoakum is Directed to a Transponder Over-Molded with an Injection Molding Material

Referring to Figures 1 and 2 of Yoakum, this reference discloses a transponder 10 having an integrated circuit 12 mounted on a circuit board 14 with a capacitor 16. The integrated circuit 12 and capacitor 16 are electrically coupled to a wire 18 formed into a coil 20. The coil 20 is wrapped around a bobbin 26 and then positioned over a core 30. The circuit board 14 is affixed to an end of the core 30. Yoakum teaches that "a tuned transponder assembly 10 can be fabricated by moving the coil 20 axially along the long axis of the ferrite core 30 until a tuned inductor/capacitor system is established and then securing the bobbin 26 with coil 20 to the ferrite core 30 during the manufacturing process." (Yoakum, col. 4, lns. 53-57.) Referring to Figures 3-7, the transponder 10 is then positioned within a molding tool 40 and over-molded with a plastic, polymeric, or epoxy injection molding material 32.

3. Claim 22 is Allowable Over the Applied References Because One Skilled in the Art Would Not Modify Yoakum's Transponder to Include Endcaps

Claim 22 is allowable over the applied references because it would not have been obvious to modify Yoakum's transponder to include endcaps. As explained above, Yoakum teaches that a circuit board 14 having an integrated circuit 12 and capacitor 16 is mounted on one end of the core 30. Thus, the claimed pair of endcaps connected to the central portion of the core would conflict with the desired arrangement of Yoakum's device. Furthermore, one of the primary inventive aspects of Yoakum is the use of the molding tool 40 to encapsulate the transponder. The endcaps would interfere with the placement of the transponder in Yoakum's molding tool and thus hinder one of the primary teachings of Yoakum.

The Office Action further alleges that it would have been obvious to modify the transponder of Yoakum to include endcaps having the same cross-sectional dimension as taught by Taylor, and that the modified transponders would be suitable for encapsulation in the molding tool 40 of Yoakum. The Office Action's characterization of Taylor, however, is inaccurate. For example, the Office Action alleges that "[t]he

endcaps [70b] of Fig. 8B of Taylor have [the] same cross-section[al] diameter as the center portion with the coil [70a] and capacitor 54." (Office Action, p. 15.) This is not correct. Taylor specifically discloses that the coil 70a is generally cylindrical and includes a center section "of reduced cross-sectional dimension and larger end members 70b." (Taylor, col. 8, lns. 19-23; emphasis added.) Accordingly, Taylor does not disclose or suggest endcaps having the same cross-sectional diameter as the coil and, as discussed above, the enlarged endcaps of Taylor would likely interfere with the placement of the transponder in Yoakum's molding tool.

The MPEP states that "[t]he mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggest the desirability of the combination." (MPEP § 2143.01; emphasis added.) Here, the prior art does not suggest the desirability of the combination and, in fact, teaches away from the combination proposed by the Office Action because Yoakum specifically teaches a molding tool 40 to encapsulate the transponder that does not include endcaps. Accordingly, the Section 103 rejection of claim 22 should be withdrawn.

I. Response to the Section 103 Rejection of Claim 19 (Mejia and Hansen)

Claim 19 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Mejia in view of Hansen.

1. Independent Claim 19 is Directed to a Miniature Resonating Marker Assembly Having a Core with a First Cap Having a First Thickness and a Second Cap Having a Second Thickness, the First Cap Being Movable Relative to a Coil to Tune the Marker Assembly to a Selected Inductance Value

Independent claim 19 is directed to a miniature resonating marker assembly. The miniature resonating marker assembly includes a core with an elongated central portion and two enlarged caps attached to the central portion. The first cap has an axial thickness different than the axial thickness of the second cap. A wire coil is disposed around the central portion of the core between the first and second caps, and a capacitor is connected to the coil adjacent to the core to form a signal element tuned to

a selected resonant frequency. The first cap is movable relative to the coil and capacitor to tune the marker assembly to have a selected inductance value.

2. Claim 19 is Patentable Over Mejia and Hansen Because the Applied References Fail to Disclose or Suggest a First Cap Being Movable Relative to the Coil and Capacitor for Tuning the Marker Assembly

Claim 19 is patentable over Mejia and Hansen under Section 103 because these references fail to disclose or suggest "a first cap being movable relative to the coil and capacitor for tuning the marker assembly to a selected resonant frequency." As discussed previously, however, Mejia teaches a unitary core 12 having a coil forming portion 16 and an IC support portion 18. The core 12 in Mejia is not movable relative to the coil 20 or the capacitor 28, and the core 12 does not appear to have any moveable components. Furthermore, as discussed above, Hansen does not teach or suggest a core having more than one adjustable segment or portion. The rod 11 of Hansen is movable relative to the coil 13; however, Hansen's rod 11 is a single, unitary member and does not include a cap movable relative to the coil 13 and/or capacitor 15 for tuning the marker assembly. Accordingly, the combination of Mejia and Hansen does not teach or suggest all the claimed features and, therefore, the Section 103 rejection of claim 19 should be withdrawn.

J. Response to the Section 103 Rejection of Claim 25 (Lemberger and Taylor)

Claim 25 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Lemberger in view of Taylor.

1. Independent Claim 25 is Directed to a Resonating Marker Assembly Having a Core with a First Magnetic Permeability and Enlarged Endcaps Having a Second Magnetic Permeability Different than the First Magnetic Permeability

Independent claim 25 is directed to a resonating marker assembly. The resonating marker assembly includes a core having a central portion intermediate to a pair of enlarged endcaps. The central portion of the core has a first magnetic permeability and the enlarged endcaps have a second magnetic permeability different

than the first magnetic permeability. A wire coil is disposed around the core intermediate to the endcaps, and a capacitor is operatively connected to the coil to form a signal element that generates a magnetic field with a selected resonant frequency in response to a specific stimulus. The resonating marker assembly also includes an inert encapsulation member encapsulating the core, the wire coil, and the capacitor to form an activatable unit implantable in a patient through an introducer needle.

2. Claim 25 is Patentable Over Lemberger and Taylor Because the Applied References Fail to Disclose or Suggest a First Cap Being Movable Relative to the Coil and Capacitor for Tuning the Marker Assembly

Claim 25 is patentable over Lemberger and Taylor because these references fail to teach a core having a central portion with "a first magnetic permeability" and enlarged endcaps with "a second magnetic permeability different than the first magnetic permeability." The Office Action correctly notes that Lemberger "does not disclose a pair of enlarged endcaps having different magnetic permeability." (Office Action, p. 11.) The Office Action incorrectly asserts, however, that it would have been obvious to provide enlarged endcaps to the core of Lemberger in accordance with the teachings of Taylor, and that it is merely a matter of design choice to have the core and endcaps made from different material. (Id.)

The proper legal standard for a *prima facie* obviousness rejection includes, *inter alia*, whether the teaching and suggestion to make the claimed combination and the reasonable expectation of success are both found in the prior art, and not in the applicant's disclosure. (MPEP § 2143.) Here, the Office Action fails to identify where the prior art teaches or suggests making the claimed combination. Instead, the Office Action improperly creates a new standard that is based upon alleged beneficial results that could result from a combination of the references without regard for the teachings of the references.

The Office Action's unsupported conclusion to combine these two references is based solely on the alleged beneficial results that the Office Action asserts would result from combining them and goes against the teachings of the references. The Office

Action asserts that modifying Lemberger's projectile 10 to include enlarged endcaps would provide "a more accurate resonating marker assembly due to the firm position of the coil over the core by the enlarged endcaps." (Office Action, p. 11.) Such a modification to Lemberger's projectiles, however, would make the devices significantly more complicated to construct and, thus, significantly more expensive. The projectiles of Lemberger and the transponders of Taylor are used in animals. There is no need for accuracy in the devices as they are merely used to identify an animal, not any particular location or region of the animal where the device is implanted.

In contrast to the devices of Lemberger and Taylor, the claimed marker assembly is for use in human patients to precisely identify a specific region where the device is implanted. Highly accurate and sensitive components are required for such devices. Thus, there is no teaching or suggestion in the applied references to modify the crude marking devices of Lemberger and Taylor to include the complex combination and arrangement of features in the claimed marker assembly. Thus, regardless of what the Office Action believes one of ordinary skill would conclude with hindsight of Applicant's disclosure, the Examiner has failed to identify where the prior art teaches or suggests making the claimed combination. Accordingly, the Section 103 rejection of claim 25 should be withdrawn.

RESPONSE UNDER 37 C.F.R. § 1.116

EXPEDITED PROCEDURE – Art Unit 2632

Attorney Docket No. 341148005US


Conclusion

In view of the foregoing, the pending claims comply with 35 U.S.C. § 112 and are patentable over the applied art. The applicant respectfully requests reconsideration of the application and a mailing of a Notice of Allowance. If the Examiner has any questions or believes a telephone conference would expedite prosecution of this application, the Examiner is encouraged to call the undersigned at (206) 359-3258.

Respectfully submitted,

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